August 6, 2014

New England Power Company d/b/a National Grid
Salem Cables Replacement Project, EFSB 13-2/D.P.U. 13-151/13-152

I. OVERVIEW OF THE PROJECT

Applicant: New England Power Company d/b/a National Grid ("Company" or "NEP")

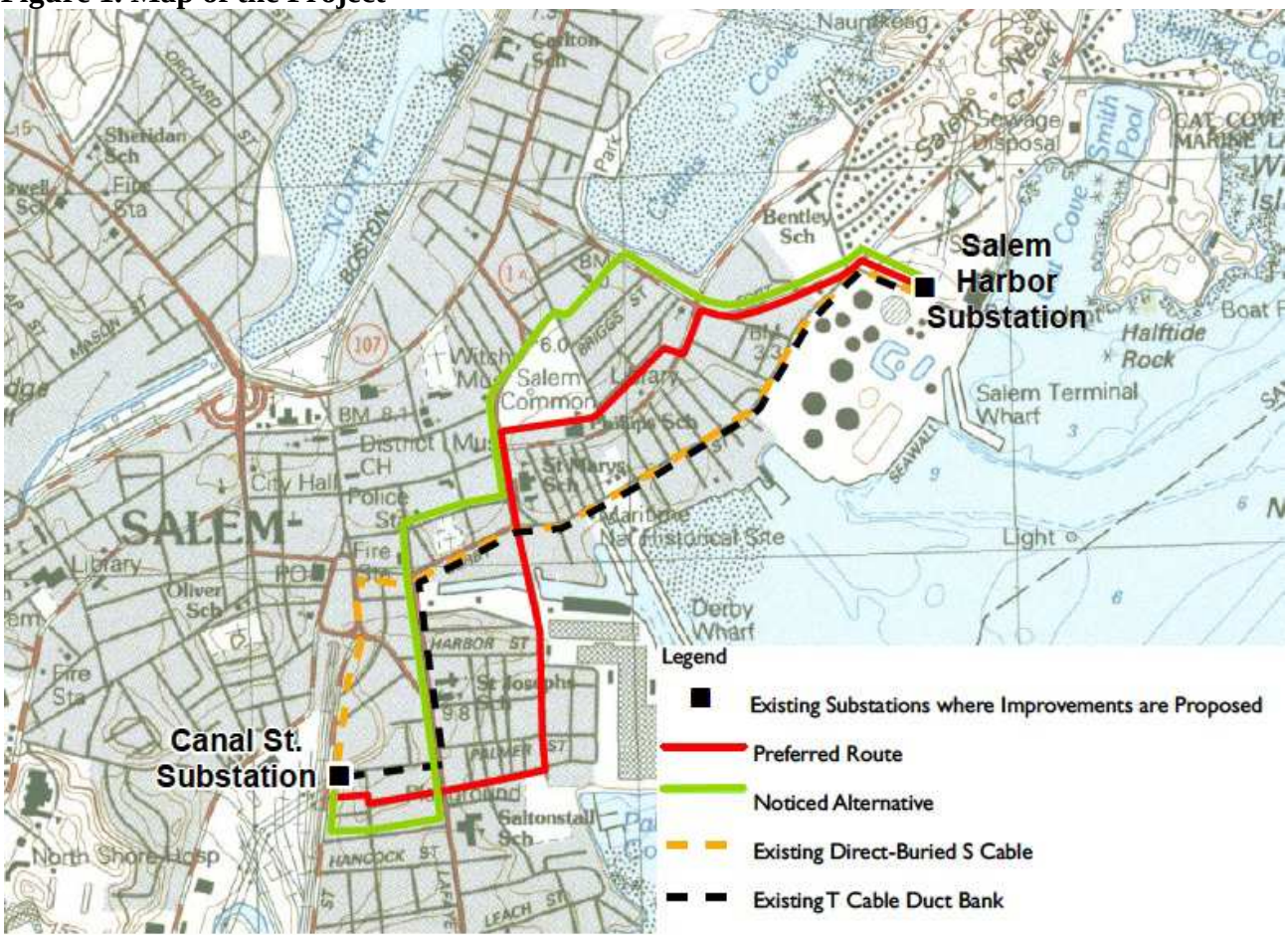
Description of Proposal: The Salem Cables Replacement Project ("Project") would replace NEP's 115 kilovolt ("kV") S-145 and T-146 underground cables ("Existing Cables"), connecting NEP's Salem Harbor Substation and Canal Street Substation in the City of Salem ("City" or "Salem"), with two new 115kV underground cables ("Proposed Cables"). The Project would replace the Existing Cables because they are approaching the end of their useful lives and are increasingly difficult to maintain and repair. To retain use of the Existing Cables while constructing the Project, the Company would locate the Proposed Cables in a new 1.63-mile underground duct bank along different streets than those used by the Existing Cables. The Project's proposed route ("Proposed Route") would pass through a mix of dense residential and commercial areas located largely within Salem's historic downtown area and along its waterfront. See Figure 1, below.

The installation of the Proposed Cables would have four phases: manhole installation, duct bank installation, cable installation, and final pavement restoration. The Existing Cables would be removed once the Proposed Cables are energized. NEP is proposing sufficient capacity for the Project to serve both forecasted regional loads as well as interconnection requirements for the proposed Footprint Power generating facility ("Footprint") at the Salem Harbor Substation. The total Project cost is estimated to be $62.43 million with an in-service date of spring 2016.

On May 22, 2014, the Company and the City entered into a memorandum of agreement ("MOA") to address certain impacts and mitigation measures related to the Project. The MOA covers a range of coordination issues related to the construction of the Project, including communication protocols, schedule considerations, acceptable construction practices, procedures for handling potential damage claims, and mitigation measures for environmental impacts. Examples of mitigation measures that the Company agrees to in the MOA include curb-to-curb repaving for all streets impacted by the Project and payment of the City's reasonable expenses for engineering consultants for work directly related to the Project. The parties have submitted the MOA in this proceeding, but have not requested the Siting Board to adopt it or otherwise attach it to the Siting Board's decision.

Noticed Alternative Route: In addition to the Proposed Route, the Company's Petition includes a Noticed Alternative Route, which also would traverse city streets and connect the Salem Harbor and Canal Street Substations. The 1.86-mile Noticed Alternative Route (0.23 miles longer than the Proposed Route) would be located near similar downtown uses, but would pass by 238 more residences and four more sensitive receptors (e.g., schools, funeral homes) than would the Proposed Route.

Figure 1. Map of the Project



Source: Exh. NEP-1, at Figure 1-1

Project Approach: The Company studied the following project alternatives in addition to the proposed Project: (1) a no-build alternative; (2) construction of two separate duct banks on two separate routes, each with one replacement circuit; (3) an overhead transmission alternative; (4) an alternative utilizing the MBTA's Newburyport/Rockport Line railroad corridor; and (5) both a jet-plow and a horizontal directional drilling ("HDD") alternative through Salem Harbor.

Due to the Project's expected impact on residences and businesses, Salem community members requested that the Company evaluate construction of a route through Salem Harbor. The Company evaluated crossing Salem Harbor by either jet plow or with HDD. While avoiding the center of Salem downtown, both water routes would still require construction in residential areas between the harbor and Canal Street Substation. Additionally, the jet plow approach would be disruptive to subsurface features of the harbor, while the HDD approach would require a long piece of land for construction staging at the landing location south of downtown. The cost of both harbor alternatives was estimated at more than double the proposed Project cost (Exh. NEP-1, at 3-41). During the proceeding, staff asked the Company to prepare a more detailed analysis of the alternative that utilized the railroad corridor based on comments from the public hearing. The Company prepared a report on this alternative, including preliminary analysis of the feasibility of utilizing HDD under the railroad tunnel parallel to Canal Street in Salem (Exh. EFSB-PA-12).

According to the report, this alternative would cost more, would have technical feasibility challenges, and would have greater environmental impacts (id.).

Despite strong initial interest of City officials and others in the community in the underwater route and then the railroad route, the City ultimately supported the Proposed Route (Tr. 3, at 407). Three business intervenors (Hawthorne Hotel, Finz Seafood & Grill, and Waters & Brown, Inc.) initially opposed the Proposed Route, but they discontinued active participation in the case before the start of evidentiary hearings.

Intervention: The City of Salem, Mary E. Madore, Kristine Doll, Footprint Power Salem Harbor Development LP, Salem Councilor-at-Large Arthur C. Sargent III, Hawthorne Hotel, Finz Seafood & Grill, and Waters & Brown, Inc. are intervenors in the case. In addition, Tim Clark, the Salem Chamber of Commerce, and New Hampshire Transmission, LLC were granted limited participant status.

Procedural History: The Petition was filed on September 20, 2013, and the Siting Board conducted public comment hearings in Salem on October 22, 2013 and November 6, 2013. The Siting Board issued four sets of information requests to NEP. Board staff held four days of evidentiary hearings in April and May 2014. Initial briefs were filed on May 23, 2014 and reply briefs were filed on May 30, 2014.

Approvals Sought: The Petition seeks approval to construct and operate the Project pursuant to G.L. c. 164, § 69J, § 72, and individual and comprehensive zoning exemptions in Salem pursuant to G.L. c. 40A, § 3.

II. SUMMARY OF ISSUES PRESENTED FOR BOARD CONSIDERATION

The following issues are presented for the Board's consideration:

1. **Project Need** Do NEP's existing S-145 and T-146 115 kV underground cables need to be replaced?

2. **Construction Schedule** Should the Company avoid construction in the downtown area during peak tourism seasons?

3. **Noise Mitigation** Should the Board mandate sound barriers for construction noise mitigation at the manhole locations?

4. **Magnetic Field ("MF") Mitigation** What, if any, magnetic field mitigation should the Board order at the manhole approaches and at the Canal Street Substation?

5. **Waiver for S-145 Cable Removal** Should the Board ask the Company to seek a waiver from the Massachusetts Department of Environmental Protection ("MassDEP") in order to leave the retired S-145 cable in the ground until a later time?

6. **Damage Claims Processing** Does the Siting Board want the Company, rather than its contractor, to process any damage claims filed by residents relating to work performed by the contractor?

7. **Zoning** Should the Board grant the individual and/or comprehensive zoning exemptions requested for the Project?

III. PROJECT NEED

The existing S-145 and T-146 lines are self-contained fluid-filled ("SCFF") cable systems containing pressurized dielectric fluid for insulation (Exh. NEP-1, at 2-3). The S-145 line, installed in 1971, is buried without a protective structure ("direct-buried") beneath public roadways in Salem (id. at 2-3 to 2-4). The T-146 line, installed in 1951, is installed in a duct bank and manhole system (id. at 1-1 and 2-3). Both cable systems have had dielectric fluid releases – especially the S-145 Cable (id. at 2-3).[1] Repairing the Existing Cables entails significant cost, unscheduled cable outages, and excavation within Salem roadways (id. at 2-5 to 2-7). Since 2003, the Company has spent $1.3 million repairing the S-145 Cable (Exh. EFSB-G-3). Additionally, replacement parts for both of the Existing Cables have been difficult to obtain because they are no longer manufactured, and there are a limited number of craftworkers trained to repair SCFF cable systems (Exh. NEP-1, at 2-5).

A 2005 study by KEMA Associates concluded that the Company should consider options for the replacement of the S-145 Cable based on its condition (Exhs. EFSB-N-2; EFSB-N-31). The Company also determined that the T-146 Cable should be replaced based on its age and condition (Exh. EFSB-N-2). By 2008, the Company had included a project to replace both Existing Cables in ISO-NE's Regional System Plan Project Listing (Exh. EFSB-N-30).[2] The Company argues that if it does not replace the Existing Cables there will be additional fluid releases with the attendant costs, environmental concerns, and public inconveniences (Exh. NEP-1, at 3-4).

The Existing Cables interconnect the Salem Harbor and Canal Street Substations as part of a series of 115 kV transmission lines and substations extending between the substations at Ward Hill and Wakefield Junction, each of which has 345 kV-to-115 kV transformers (Tr. 1, at 24-25). The set of 115 kV transmission lines between Ward Hill and Wakefield Junction moves power between these two substations, connects generation at Salem Harbor to the rest of the grid, and serves load on the North Shore (id. at 25-27).[3]

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[1] Each leak of over 25 gallons of mineral oil dielectric fluid is a reportable quantity under the Massachusetts Contingency Plan and needs to be reported to the Massachusetts Department of Environmental Protection ("MassDEP") and remediated (Tr. 2, at 250-251).

[2] The Project was delayed and revised two times: in 2011 based on Dominion Power's announcement of its intent to retire its generation facility at Salem Harbor, and in 2013 based on the proposed Footprint facility and the infeasibility of reusing the existing T-146 duct bank (Exh. EFSB-N-30).

[3] If the Existing Cables were removed without being replaced, Salem Harbor Substation would be served only by the existing B-154S/C-155S overhead transmission lines (on

NEP determined that the rating of the Existing Cables would be insufficient to interconnect the full capacity of the Footprint plant under the "worst-case" dispatch conditions, even before any system contingencies were evaluated (Exh. NEP-1, at 2-14). If the Existing Cables are not replaced, Footprint's output would be limited to the ratings of the Existing Cables (Exh. EFSB-PA-2). Neither Footprint nor NEP could specify exactly how much Footprint's output might be limited, as this would be determined by ISO-NE based on the particular circumstances on the system at any given time (Exhs. EFSB-PA-2; EFSB-SHR-2). NEP asserts that its obligation to interconnect the proposed Footprint generating facility is an additional reason for the replacement of the Existing Cables with new, higher-capacity cables (Exh. NEP-1, at 2-17).[4]

Options for Board Consideration

1. Conclude that NEP's existing S-145 and T-146 115 kV underground cables need to be replaced.

2. Conclude that NEP's existing S-145 and T-146 115 kV underground cables do not need to be replaced.

IV. CONSTRUCTION SCHEDULE

The City of Salem's many historical and cultural attractions draw numerous tourists every year (Exh. NEP-1, at 5-17). The City testified that its peak tourist season runs from mid-April to November 1, with events throughout the year, such as seasonal holiday events (Exh. NEP-1,

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double-circuit structures), and 18,500 customers in the Salem area (approximately 70 MW of load) would be at risk of a blackout in a N-1 contingency involving a loss of these double-circuit structures (Exh. EFSB-N-4).

[4] NEP's analysis demonstrated that a 647 megavolt-ampere ("MVA") long-term emergency ("LTE") rating would be required for each Proposed Cable in order to allow Footprint to generate at full capacity under all N-1-1 contingencies in all load conditions (Exh. NEP-1, at 2-16). However, NEP determined that an LTE rating of 400 MVA for each of the Proposed Cables would be adequate to meet all other transmission system reliability requirements over the forecast period (id.). Due to space constraints along the Proposed Route, achieving a 647 MVA LTE rating would necessitate two separate duct banks on two separate routes and would cost an estimated $71.76 million compared to the proposed Project's estimated $62.43 million cost (Exh. EFSB-N-17). Footprint would likely have been responsible for the cost increment of this alternative. Instead, Footprint committed to ramp down its units under certain contingencies and load conditions, allowing the Proposed Cables to be built with a 400 MVA LTE rating (Exhs. NEP-1, at 2-16; EFSB-N-17).

at 5-17; RR-EFSB-26).[5] The Company's current construction schedule (see Table 1, below) does not include any work in October, to comply with the City's request to avoid impacts during the Halloween tourist season (Exhs. NEP-1, at 5-11; EFSB-G-15). Additionally, the Company's current construction schedule has manhole installation scheduled from November 2014 through January 2015 and cable pulling and splicing scheduled from November 2015 through March 2016, so all work at the manhole locations is currently scheduled outside of the peak tourist season (Exh. EFSB-G-15).

Table 1. Preliminary Construction Schedule for Cable Installation Work

Type of Work	**Construction Dates**
Manhole Installations	November 2014 - January 2015
Duct Bank Installations	January 2015 – September 2015
Cable Pulling	November 2015 – January 2016
Cable Splicing	January 2016 – March 2016
Cable Energization	April 2016 – May 2016
Final Pavement Restoration	March 2016 – May 2016

Source: Exh. EFSB-G-15

As shown in the table above, duct bank installation is currently scheduled to take place from January 2015 through September 2015, overlapping partially with Salem's peak tourist season (Exh. EFSB-G-15). The Company stated that while duct bank installation work must proceed linearly between two manhole locations, the Company could choose the order of each segment between adjacent manhole locations. The Company speculated that its contractor may prefer to construct the entire route in a single directional sequence (Tr. 1, at 98-99). The Company's Preferred Route would have six manhole locations (as shown in Figure 2 below) plus the two substations, equating to seven segments of duct bank installation (Exh. EFSB-CM-14). The City requested that duct bank installation occur only between January and April for the segment from Washington Square South to Hawthorne Boulevard (in the heart of Salem's historic downtown) (RR-EFSB-37).

[5] As a condition to the MOA, the City has provided the Company with a schedule of local events that could be impacted by the Project, such as the Black Cat Road Race and the Salem Film Festival. The Company has agreed to incorporate these schedules into its construction bid documents (RR-EFSB-44).

Figure 2. Map of Project with Manhole Locations

Source: Exhs. NEP-1, at Figure 1-2; EFSB-CM-14

Additionally, the City requested that, to the extent possible, all work – not just duct bank installation – on Washington Square South, Hawthorne Boulevard, and Derby Street take place during November through April (outside of peak tourist season), with as much of the work as possible occurring between January and April. The City also prefers that the Company avoid construction on these three downtown streets during November and December (RR-EFSB-37). Based on the current schedule, work that might occur on these three streets during the peak tourist season includes one segment of duct bank installation (described above) and the removal of the existing S-145 Cable,[6] as well as a short segment of duct bank installation on Washington Square South (approximately 150 feet) and duct bank installation through the intersection of Derby Street and Hawthorne Boulevard (Exh. EFSB-CM-14).

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6 The possibility of rescheduling the removal of the existing S-145 Cable is discussed separately below in Section VII.

The Company has not raised specific concerns about any of the City's construction schedule requests, nor has the Company agreed to the requests. The issue of avoiding some or all construction on certain historic downtown streets for the entire peak tourist season – and potentially for November and December as well – was not addressed in the MOA.

Options for Board Consideration

1. Impose no requirements on the Project's construction schedule other than an October construction moratorium (which would apply for all options).

2. Require the Company to complete the duct bank installation between the manhole locations on Washington Square South and Hawthorne Boulevard between January and April (avoiding peak tourist season and November and December).

3a. Option 2, plus require the Company to complete all work on Washington Square South, Hawthorne Boulevard, and Derby Street between November and April (avoiding peak tourist season).

3b. Option 2, plus require the Company to complete all work on Washington Square South, Hawthorne Boulevard, and Derby Street between January and April (avoiding peak tourist season and November and December).

V. NOISE MITIGATION AT MANHOLE LOCATIONS

Noise from the construction of the Project would impact adjacent residences, businesses, and other sensitive uses (Exh. NEP-1, at 5-26). To minimize noise impacts, staff explored a variety of mitigation strategies beyond those proposed by the Company. Noise mitigation at manhole locations are of particular concern as these areas would face both longer workdays and a longer construction schedule than would duct bank installation locations. Noise mitigation options for manhole locations and substations are discussed below.

The Company has provided noise estimates in A-weighted decibels ("dBA"). For reference, a ten dBA noise increase is perceived as a doubling in loudness to the average person, while a noise increase less than three dBA is typically regarded as imperceptible (EFSB-NO-6). Some sound levels are provided in the table below.

Table 2. Typical Sound Levels

Noise Source	Sound Level (dBA)
Gas Lawn Mower at 3 feet	95
Diesel Truck at 50 feet	85
Shouting at 3 feet	75
Normal Speech at 3 feet	65
Quiet Urban Area (Daytime)	55

Source: Exh. EFSB-NO-6

The Company estimated that work at the each manhole location would take a total of 43 construction days, whereas duct bank installation between manhole locations would take between ten and 25 construction days (Exh. EFSB-CM-3). Manhole location abutters would also face extended work days. The Company estimated that cable splicing would take approximately twelve days at each pair of manholes and would require extended work days of ten to twelve hours (Exhs. EFSB-CM-3; EFSB-NO-14).

Noise sources from cable pulling and splicing at the manhole locations would include a generator, an air conditioner, and a splicing van. The Company estimated that maximum noise impacts from cable pulling and splicing would be up to 84 dBA at 50 feet (Exh. NEP-1, at 5-27).[7] The Company subsequently committed to use a WhisperWatt generator, or its equivalent, in order to reduce noise impacts for cable pulling and splicing. The WhisperWatt generator would have a maximum noise impact of 58 dBA at 50 feet (Exh. EFSB-NO-12). With the use of the WhisperWatt generator, the loudest noise from the cable pulling and splicing would be the vehicle noise from the splicing truck, which would produce up to 75 dBA at 50 feet (RR-EFSB-29).

In addition to the approximately 24 days of cable pulling and splicing that would occur at each manhole location, manhole installation and duct bank installation at the manhole approaches would take another 18 days (Exh. EFSB-CM-3). Manhole installation would have greater noise impacts than cable splicing; maximum noise levels from pavement saws, manhole cranes, asphalt pavers, backhoes, and dump trucks would be up to 90 dBA at 50 feet (Exh. NEP-1, at 5-27).

One potential mitigation measure would be to use portable sound barriers. Sound barriers are not addressed in the MOA. The Company stated that sound reduction for portable sound barriers typically ranges from eight to 15 dBA for receptors at the ground level and five to eight dBA for the second floor of an adjacent building (RR-EFSB-41). The Company stated that the use of movable noise barriers would create two hours of additional work each and would require an additional construction vehicle for delivery at the start of each shift, adding significant labor costs to

[7] The Company stated that NSTAR used portable noise barriers during the splicing of a 345 kV underground transmission project in Stoughton, but the Company emphasized that NSTAR's Stoughton project required a 24-hour-a-day schedule during splicing operations. In contrast, splicing operations for the Project are expected to last ten to twelve hours a day (RR-EFSB-28).

the Project by either extending the construction workday or lengthening the construction schedule (RR-EFSB-28; RR-EFSB-42). The Company stated that the necessary space for vehicles and equipment to maneuver around the worksite during manhole installation would mean that the portable noise barriers would need to be set back from the worksite, increasing the footprint of the Project, which could result in additional road closures or blocked sidewalks (RR-EFSB-28; RR-EFSB-42). Further, in order to maintain access to the site and private driveways, a continuous noise barrier around some worksites may not be feasible, reducing the effectiveness of the noise mitigation (RR-EFSB-42).

One option for mitigation could be the selective use of portable noise barriers at manhole locations when they would be a practical solution and serve to mitigate significant noise impacts. The Board could mandate the use of noise barriers both on days when the Company expects construction equipment to produce noise levels at or near the maximum range for extended periods of time, such as prolonged jack hammering, and at locations where it would be feasible for the Company to maintain a near-continuous noise barrier around the noise source.

Options for Board Consideration

1. Require only the noise mitigation proposed by the Company.

2. In addition to Option 1, require the Company to develop a mitigation plan for the selective use of portable noise barriers for work at manhole locations when maximum noise impacts are expected for significant durations and site conditions allow the effective use of noise barriers.

VI. EMF MITIGATION AT MANHOLE APPROACHES

Electrical current in the Proposed Cables will create magnetic fields since magnetic fields are created whenever current flows in a conductor (Exh. NEP-1, at 5-34). The Siting Board has found that although some epidemiological studies suggest a statistical correlation between exposure to magnetic fields and childhood leukemia, there is no evidence of a causal relationship between magnetic field exposure and human health. Footprint Power Salem Harbor Development LP ("Footprint"), EFSB 12-2, at 99 (2013); Pioneer Valley Energy Center, LLC, EFSB 08-1, at 42 (2009); Sithe Mystic Development, LLC, EFSB 98-8, at 86-87 (1999). However, in past decisions, the Board has recognized public concern about EMF and has encouraged the use of practical and cost-effective design to minimize magnetic fields along transmission rights of way ("ROWs"). New England Power Company and Western Massachusetts Electric Company ("GSRP"), EFSB 08-2/ D.P.U. 08-105/D.P.U 08-106, at 87 (2010); Cambridge Electric Light Company, EFSB 00-3/D.T.E 00-103, at 38 (2001); IDC Bellingham, LLC, EFSB 97-5, at 104 (1999).

A. EMF Mitigation at Manhole Approaches

NEP stated that its plan to place both the S-145 and T-146 circuits in a single duct bank would allow the Company to minimize these magnetic fields with an optimized phase arrangement

(Tr. 2, at 205).[8] However, as the Proposed Cables approach the paired manhole vaults, the two circuits would split into separate duct banks and would have less self-cancellation, resulting in higher magnetic field levels at these locations (Exh. NEP-1, appendix 5-2, at 15). As originally designed (i.e., with no additional mitigation), magnetic fields directly above the duct bank near the manhole would be 143 milligauss ("mG") at summer normal maximum loading conditions, which is higher than magnetic field levels projected in past underground transmission line cases approved by the Siting Board (see Table 3 below) (id. at 5-35 and appendix 5-2, at 16).[9]

Table 3. Magnetic Fields above Underground Cables in Streets

EFSB Number	Case	Maximum Magnetic Field (mG)	Magnetic Field Off-center (mG)	Load Flow
09-1	Worcester	50	15 mG (at 10 feet)	Normal
04-1	Stoughton-Boston	1.1	undetectable (at 15 feet)	Peak
02-2	Cape Wind	32	Unknown	Peak Generation
00-3	CELCO/Kendall	124	<85 mG (at 5 feet); 10 mG (at 25 feet)	Peak Generation

Sources: New England Power Company, EFSB 09-1/D.P.U. 09-52/ D.P.U. 09-53, at 60-61 (2011); Boston Edison Company, EFSB 04-1/D.T.E. 04-5/D.T.E 04-7, at 125 (2005); Cape Wind Associates, LLC, and Commonwealth Electric Company, EFSB 02-2, at 114 (2005); Cambridge Electric Light Company, EFSB 00-3/D.T.E 00-103, at 33 (2001).

The Company evaluated means of potential mitigation that would reduce magnetic fields at the approaches to manholes. One form of mitigation for the Proposed Cables would be to install

[8] Over most of the route, the circuits would be in a configuration of three phases of one circuit placed in a horizontal arrangement over the other circuit (three over three), which results in lower magnetic field levels than a vertical arrangement at most locations (except directly over the duct bank) (Exh. NEP-1, appendix 5-2, at 3-4). In some locations, a vertical arrangement of the cables (two wide by three deep) would be used, resulting in higher magnetic fields to the sides but lower levels directly above the duct bank (id.). The burial depth of cables varies depending on the location of existing underground utilities, and would vary from 2.5 to ten feet (Exh. NEP-1, appendix 5-2, at 3). For the shallowest locations, the magnetic field three feet above pavement at the centerline would be 55 mG for a horizontal configuration and 43 mG for a vertical configuration (Exh. NEP-1, appendix 5-2, at 10-13). At locations 15 feet laterally from the duct bank centerline, the magnetic field would be nine to ten mG for the horizontal configuration and 16 to 18 mG for the vertical configuration (id.). At all locations where the duct bank is buried over six feet deep, maximum magnetic fields would be less than 20 mG (id.).

[9] The area above the manhole vaults has lower magnetic fields than the area above the manhole approaches because the manhole vaults contain reinforcing steel and a copper ground ring (Tr. 2, at 204). The 143 mG figure represents the shallowest depth at which cables would enter a manhole vault, 3.8 feet (Exh. NEP-1, appendix 5-2, at 15-18).

wire loop shielding alongside the manhole approaches but not attached to the cables, designed such that an opposing current would be induced in the wire loop by current in the Proposed Cables, thereby cancelling out some of the original magnetic field ("uncompensated passive loops") (id. appendix 5-2, at 19). Another form of mitigation would be similar but would add capacitors to the loops to increase current in the loops and thereby enhance the cancellation effect ("capacitive-compensated passive loops") (id. appendix 5-2, at 15; RR-EFSB-13). A third option would be to install the manhole vaults several feet deeper. The Company provided costs and details for these three underground EMF mitigation options.

NEP modeled the uncompensated passive loops as one-inch copper cables formed into a rectangular loop shape with dimensions of 50 feet along the Proposed Cables and six feet vertical, installed nine inches to the outside of the Proposed Cables (Exh. NEP-1, appendix 5-2, at 20-22; Tr. 2, at 203). The Company stated that capacitive-compensated passive loops would require two electrical boxes per manhole and that the capacitors would need to be inspected at least every year to confirm that they were still in operation, for which inspection the Company would need to switch off the Proposed Cables (RR-EFSB-13). This would add ongoing operational and maintenance costs to the installation costs provided below (id.). The Company testified that any type of passive loop mitigation would be relatively novel; one Company witness was unaware of any application within the United States and a second witness was aware of one project in the United States that had installed this mitigation but had not yet published results (Tr. 2, at 211-213). In the Petition, the Company proposed uncompensated passive loops to mitigate the magnetic fields at the approaches to the manholes (Exh. NEP-1, at 5-38).

The Company also evaluated burying the manhole vaults four feet deeper than planned, which would offer mitigation comparable to the capacitive-compensated passive loops. While the duct banks on the approaches to the manholes would then be installed four feet deeper underground, burying the manholes deeper would also increase the distance that the Proposed Cables would be divided into two separate duct banks by about 50 feet in each direction – which would increase the length where the Proposed Cables have more limited self-cancellation (Tr. 2, at 216; RR-EFSB-13).

Table 4, below, identifies resultant magnetic field levels and installation costs for the options evaluated by NEP. The modeled magnetic field values assume a loading of 250 MVA for each cable, representing a summer normal maximum loading condition with full generation operating the proposed Footprint generating facility (Exh. NEP-1, at 5-35).

Table 4. Manhole Approach Areas Magnetic Field Mitigation Efficacy and Cost

Mitigation Strategy	Magnetic Field (mG) based on Distance from duct bank centerline			Cost to Install Mitigation
	-25 feet	0 feet	25 feet	
No mitigation	30	143	27	$0
Uncompensated Passive Loop	26	71	24	$100,000
Capacitive-Compensated Passive Loop	25	53	23	$336,000
Additional Vault Depth (4') with No Passive Loop	24	56	21	$611,000

Sources: Exh. NEP-1, at Appendix 5-2 at 18; RR-EFSB-13. Fields are based on 250 MVA on each circuit.

Options for Board Consideration

1. Do not draft a condition in the Board's Tentative Decision specifying magnetic field mitigation at the manhole approaches, but require the Company to study and report back to the Siting Board on the efficacy of any magnetic field mitigations it undertakes. (Note: The Board assumes that the Company will install uncompensated passive loops as described in the Petition unless a project change is submitted.)

2. Require uncompensated passive loops, and require the Company to study and report back to the Siting Board on the efficacy of this mitigation.

3. Require capacitive-compensated passive loops, and require the Company to study and report back to the Siting Board on the efficacy of this mitigation.

4. Require that the Company bury the manhole vaults deeper, and require the Company to study and report back to the Siting Board on the efficacy of this mitigation.

B. EMF Mitigation at Canal Street Substation

The Proposed Cables would also separate from each other as they enter the Canal Street Substation. NEP modeled magnetic fields around the Canal Street Substation for loads of 250 MVA on each cable (RR-EFSB-14-S). Because the Existing Cables enter the Canal Street Substation site from the east and the west and the Proposed Cables would enter the site from the south, the magnetic field levels would increase at the site's southern perimeter and decrease in other locations (Attachment to RR-EFSB-14-S at 12).[10] Based on the Company's original design, its modeling showed that at summer normal maximum loading conditions, the magnetic field above the Proposed Cables would be over 200 mG at the Company's property line adjacent to the Cypress Street sidewalk (id. at 10).

[10] The Company modeled magnetic field levels from the existing layout at Canal Street Substation above 300 mG; these levels would decrease below 100 mG with the Project (RR-EFSB-14).

To reduce the magnetic fields, the Company proposed an alignment change in which the S-145 and T-146 cables would remain in the same duct bank into the Company's property at the Canal Street Substation and the configuration of the cables within the duct bank would be slightly altered (RR-EFSB-14-S-2). When the Proposed Cables are in the same duct bank, the highest magnetic field level directly above the duct bank would be 55 mG (Exh. NEP-1, appendix 5-2, at 10-13). The S-145 Cable would be within 15 to 25 feet of the western edge of the adjacent residence at 8 Cypress Street, so the Company evaluated the magnetic field levels from the separated S-145 cable in the originally proposed alignment and the new alignment (RR-EFSB-14-S-2). Table 5 below shows that the new configuration would lower the magnetic field levels at the abutting residence. The Company also modeled an uncompensated passive loop adjacent to the S-145 cable and found that it would be ineffective in reducing magnetic field levels (id.).

Table 5. Comparison of modeled magnetic field levels for the originally-proposed and new configurations

Configuration	Peak value (mG)	15 feet east of S-145 (mG) (at closest corner of adjacent residence)	25 feet east of S-145 (mG) (along west side of adjacent residence)
Originally proposed	221	43	23 (+/- 2)
New configuration with mitigation	173	25 (+/- 4)	23 (+/- 2)

Source: RR-EFSB-14-S-2. Fields are based on 250 MVA on each circuit.

There are outstanding record requests (RR-EFSB-48 and 49) about an option to move the alignment of the S-145 Cable even farther to the west. Staff will provide an update on this option to the Siting Board at the August 14, 2014 Board meeting.

Options for Board Consideration

1. Require the Company to implement the proposed alignment change described above.

2. Require the Company to implement an alternative alignment change that moves the S-145 and T-146 cables farther to the west (i.e., away from the residence at 8 Cypress Street) as they enter the Canal Street Substation.

VII. WAIVER FOR S-145 CABLE REMOVAL

NEP testified that once the existing oil-filled cables have been removed from service, they would no longer be pressurized and monitored, and the Company would have no ability to detect any new leaks (Exh. EFSB-HW-3).[11,] As a result, the Company indicated that once removed from

[11] After the Existing Cables are removed from service, the Company would flush them with water and then purge them with nitrogen or another gas to remove as much of the dielectric fluid as feasible (Tr. 2, at 249-250). The Company estimated that approximately 430 gallons

service, the Existing Cables would be regulated both as hazardous waste to be managed under 310 CMR 30 and as a Threat of Release subject to the Massachusetts Contingency Plan ("MCP") 310 CMR 40 (id.; Tr. 2, at 248).[12] Under 310 CMR 30, the Company would need to remove the Existing Cables from the street within 90 days of removal from service (Tr. 2, at 248; RR-EFSB-16). The Company indicated that under the MCP, a two-hour notification requirement would be triggered and an "Immediate Response Action" would also be required once the Existing Cables were removed from service (Exh. EFSB-HW-3).[13]

The Company stated that the Existing Cables would be de-energized in the same time frame as the Proposed Cables are energized (Tr. 1, at 107). Under the current schedule, this would occur in April or May 2016 (Exh. EFSB-G-15). Removal of the direct-buried S-145 Cable would require excavating a trench along the route of the cable (Exh. NEP-1, at 5-48). Because the T-146 Cable is installed in a duct bank, the Company anticipates being able to pull the T-146 Cable out through the manholes without excavation (id. at 5-50). The Company estimated that it would take approximately two months to excavate the direct-buried S-145 Cable (Tr. 2, at 253).

In the City's cover letter to the MOA – which the City submitted in lieu of a brief – the City requested that the Siting Board require the Company to seek a waiver from MassDEP so that the removal of the S-145 Cable is not performed during the months of May through October to avoid the peak tourist season. The City stated a preference for the removal of the S-145 Cable between January and April. During the proceeding, the Company stated that it does not expect that MassDEP would grant a waiver from the 90-day requirement because the Company believes it would lack a sufficient basis to assert that leaving the cable in the ground for more than 90 days would be an insignificant potential harm to public health, safety, welfare, or the environment (RR-EFSB-16). Additionally, the dielectric fluid in the decommissioned line would pose a threat of release under the MCP and there is no express means to obtain a waiver from the two-hour notification requirement (id.). The Company states that it is willing to work with MassDEP, the Siting Board, and the City to determine whether a mutually agreeable solution could be reached, but emphasized that it must comply with the rules and regulations of the MassDEP (Company Reply Brief at 2). While delaying the time by which the Existing Cables are removed would lessen the impacts of the Project on Salem's peak tourist season, it would also extend the period during which additional undetected leakage might occur.

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of dielectric fluid would remain in each phase after the flushing, compared to the current total of approximately 1,000 gallons of dielectric fluid per phase (id.).

[12] The reportable quantity for dielectric fluid under the MCP is 25 gallons (Tr. 2, at 250-251).

[13] Immediate Response Actions are assessment and/or remedial actions that must be undertaken in an expeditious manner to address sudden releases, Imminent Hazards and other time-critical release or site conditions. Immediate Response Actions must be taken whenever and wherever timely actions are required to assess, eliminate, abate or mitigate adverse or unacceptable release, threat of release and/or site conditions, as set forth in 310 CMR 40.0412. 310 CMR 40.0405(2).

Options for Board Consideration

1. Require the Company to consult with MassDEP on: (a) the potential threat of release of oil or hazardous materials posed by unpressurized, unmonitored dielectric fluid in the S-145 Cable under the MCP; and (b) the potential applicability of NEP obtaining a waiver under MassDEP's hazardous waste regulations.

2. Include no condition relative to the timing of the removal of the S-145 Cable in the Tentative Decision.

VIII. DAMAGE CLAIMS PROCESS

The route of the proposed Project passes by many historic homes with foundations that are potentially vulnerable to damage resulting from Project construction. Construction of the Project may also cause other types of damage to property and vehicles in the area. During the proceeding, staff raised the issue of the damage claim process in the event that a resident's property (e.g., the home's foundation) were damaged as a result of the construction.[14] The Company's witness testified that the Company would direct potentially injured parties to the contractor, who would administer a damage claim process (including appropriate insurance coverage) for such customers, (Tr. 2, at 302). The Company testified that National Grid's damage claims department might get involved as necessary (id. at 305).

The Company would have a stakeholder representative who serves as the initial point of contact for issues relating to the Project (id. at 304-305). However, in the case of liability claims, the Company testified that the stakeholder representative would refer potential claimants to the contractor (id. at 302). Information about the damage claims process would also be available on the Project website (id. at 321-322). The Company stated that its "typical process" is that the contractor is responsible for damage claims since the contractor is the entity that presumably caused the damage and the contractor would be required to have insurance to cover such claims (id. at 305). The Company argued that it is not legally liable for damage that arises from the tortious acts of its independent contractors (RR-EFSB-22). The Company suggested that it endeavors to be a responsible and responsive partner within its host communities, but does not believe it should be liable for the acts of its contractors (id.).[15]

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[14] Staff also explored this issue because of the apparent confusion about who would be handling claims that had arisen in earlier projects involving the City of Salem and two Massachusetts Department of Transportation ("MassDOT") projects. In those projects the contractor indemnified MassDOT from any damage that was done as part of the construction project and residents of Salem had no way to request review of the contractor's determination concerning damage claims (Tr. 3, at 386-387). The City testified that the process did not work well and that the City had to get involved (Tr. 3, at 387-388).

[15] The Board has not directly addressed the management of the damage claims process in any earlier cases, making this an issue of first impression. However, the Board has addressed outreach and communication between residents/communities and Companies in order to avoid complications during project construction and operation.

Two intervenors, Mary Madore and Kristine Doll, raised concerns about this process and their ability as homeowners to resolve damage claims with a contractor. They voiced concern about the potential lack of responsiveness and accountability of contractors based on difficulties that occurred with other projects.

In the MOA, the Company and the City agreed to have NEP's contractor manage the damage claims process with the condition that the contractor provides weekly notice of damage claims to NEP's Stakeholder Representative. In turn, the Stakeholder Representative will provide the City Engineer with a weekly summary of the damage claims. The MOA states, "NEP's agreement to acquire claims processing information and provide it to the City is not an agreement or acceptance by NEP to be responsible for compensating for claims resulting from the negligence, gross negligence, reckless misconduct or intentional acts of the Contractor."

In Massachusetts the law suggests that, contrary to the Company's claim, liability in these circumstances would remain with the utility company. There is a general legal rule, with many exceptions, holding that one who employs an independent contractor is not ordinarily liable for the independent contractor's negligence. One of the exceptions is where a corporation is operating its business under a franchise granted by public authority, such as a public utility. In that case, the franchisee is subject to liability for damage caused to others by the negligence of a contractor who is hired by the franchisee to perform the work of the franchisee. Restatement (Second) of Torts, § 428; Restatement (Third) of Torts, § 64. The Supreme Judicial Court accepted this principle stated in the Restatement of Torts in Barry v. Keeler, 322 Mass. 114, at 126-127 (1947), in which the Court held that a motor transport carrier franchised by the Interstate Commerce Commission and the Department of Public Utilities could be found liable for the negligence of its independent contractor. The Court said that "[t]he rationale of the rule is that it is considered contrary to public policy to permit one engaged in such an activity to delegate his responsibility to others." Id. at 127. The franchisee has a responsibility "that is not discharged solely by non-negligently hiring an independent contractor." Restatement (Third) of Torts, § 64, *Rationale.*[16]

Independent from the legal question of liability, the Board may wish to review whether the Company or its contractor(s) should assume the primary administrative responsibility for communicating with affected property owners and processing damage claims relating to construction of the Project. The potential for customer confusion, or a level of customer service that does not meet the legitimate expectations of NEP's customers, are relevant considerations for the Board in addressing this issue. Regardless of who processes claims, the Board may want to comment in the Decision that the Company should not instruct potential claimants that NEP has no liability in such matters as such a conclusion appears contrary to current case law.

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16 NEP can attempt to recover the financial consequences of being liable for the contractor's actions through an indemnity provision in its construction contracts.

Options for Board Consideration

Regarding damage claims process:

1. Require NEP to process all damage claims.

2. Allow the MOA to govern the claims reporting process, and allow NEP's contractors to process all damage claims.

3. Allow the MOA to govern the claims reporting process only for claims made by the City of Salem, but require NEP to process all other damage claims.

Regarding legal considerations:

1. Include a statement in the Tentative Decision that NEP should not make representations to the public that the Company bears no legal liability for damage caused by its independent contractors as such a statement appears contrary to current case law.

2. Do not include such a statement.

IX. ZONING EXEMPTION REQUEST

NEP requested both individual and comprehensive exemptions from the City of Salem Zoning Ordinance (Exh. NEP-2, at 1). The Company requested two individual zoning exemptions from the Zoning Ordinance, both related to the Special Permits that would be required to construct a new control house building at the Canal Street Substation (Exh. NEP-3-1, at 5-6).

On August 28, 2013, the Company filed a petition with the City of Salem Zoning Board of Appeals ("ZBA") for these Special Permits (Exh. NEP-2, at 16). On September 18, 2013, the ZBA held a public hearing on the petition and voted in favor of granting the Special Permits (Exh. EFSB-Z-3). The ZBA issued its decision on October 2, 2013; the approval contained several conditions, including conditions related to the appearance of the fence and landscaping at the Canal Street Substation (Exh. EFSB-Z-4). The Company testified that none of the conditions was burdensome or unusual (Tr. 3, at 368). No appeals were filed; the appeal period expired October 22, 2013 (Exh. EFSB-Z-2). However, the Company has maintained its request for both the individual and comprehensive zoning exemptions (id.).[17]

A. Individual Zoning Exemptions

The Company stated that it has maintained its request for the two individual zoning exemptions – in addition to the comprehensive zoning exemption – because if substantial use or construction has not begun within 24 months of the Special Permit approval, the permits would

[17] Based on the MOA, the City supports the zoning exemptions, and requests that the Siting Board include the conditions contained in the Special Permit Approval (May 23, 2014 cover letter to the MOA).

lapse (Exh. EFSB-Z-2).[18] The Company has until October 2, 2015 to begin construction under the current Special Permit approval; currently the Company plans to begin construction in November 2014 (Exh. NEP-1, at 1-8). The Company argues that an appeal of the Siting Board's decision or some other circumstances beyond the Company's control could delay the Project (Exh. EFSB-Z-2).[19]

The standard of review for individual zoning exemption requires: (1) a finding that the petitioner qualifies as a public service corporation; (2) that the petitioner requires the exemption; and (3) the present or proposed use of the land or structure is reasonably necessary for the public convenience or welfare.

The issue before the Board is whether NEP requires the two individual zoning exemptions based on the information provided above given that the Company has already received the Special Permits from the City of Salem and no appeals have been filed.

B. Comprehensive Zoning Exemptions

The Company offered three reasons why a comprehensive zoning permit is still necessary, despite its receipt of the two Special Permits from the ZBA. First, the Company believes that a comprehensive zoning exemption would also address the risk that the special permit approval the permits could lapse, as discussed above for individual zoning exemptions (Exh. EFSB-Z-2). The Company's second argument is that if the City were to amend or enact new zoning provisions, these provisions would apply to the Project since construction did not commence within six months of the permit issuance or by April 2, 2014 (Tr. 3, at 352).[20] Third, the Company argues that design changes – either an unanticipated design change or a change ordered by the Siting Board or some other regulator – could necessitate new zoning relief (id. at 361). For example, NEP suggested that relocating the new control house at the Canal Street Substation could necessitate further zoning relief (Exh. EFSB-Z-7).

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18 Section 9.4.7 of the City's Zoning Ordinance states that Special Permits would lapse if construction has not begun within 24 months of the Special Permit approval "except for good cause" (Exh. EFSB-Z-2). The Company stated that good cause is not defined and there is no defined procedure for seeking an extension (Tr. 3, at 356-358).

19 The Siting Board's decisions typically state that construction must commence within three years of the approval. While an individual zoning exemption could extend the Company's timeframe for construction, it does not extend the timeframe indefinitely.

20 The Company stated that the Project would be protected by another six-month immunity period from any new zoning amendments or provisions once it receives the building permit for the new control house, but in the interim, new zoning amendments or provisions would be applicable to the Project (Tr. 3, at 362). As of May 7, 2014, the City stated that it was not planning any new zoning amendment or provision that would impact the Project and estimated that new zoning amendments or provisions typically take no more than 90 days from being introduced to being adopted (RR-EFSB-25).

The Company asserted that the Project is needed in the immediate time frame in order to provide reliable transmission service and to increase the capacity of the electric system in the area (Exh. NEP-2, at 13). Further, the Company stated that the existing transmission system is inadequate to adequately interconnect the proposed Footprint generating facility and, therefore, the Company prioritized alternatives that could be completed by Footprint's required in-service date of June 2016 (Exh. NEP-1, at 2-17 and 3-2).[21] However, the Company also stated: "Service to electric customers would not be interrupted should the cable replacement project not be in service by June 2016. The system would continue to operate with whichever two circuits are in place at the time. Footprint, however, would be limited to operate at an output level within the ratings of the circuits in place at the time." (Exh. EFSB-PA-2). If Footprint's start-up date were to be delayed for any reason, the need for this Project would be less urgent.

In reviewing requests for comprehensive zoning exemptions under G.L. c. 40A, § 3, both the Department and the Board have stated that such requests are reviewed on a case-by-case basis, and granted only where the applicant demonstrates that issuance of the comprehensive exemption could avoid "substantial public harm" by serving to prevent delay in the construction and operation of the proposed facility. The Department and the Board have cited additional factors as relevant in making such a determination, including whether: (1) the project is needed for reliability; (2) the project is time sensitive; (3) there are multiple municipalities involved that could have conflicting zoning provisions that might hinder the uniform development of a large project spanning these communities; and (4) the communities affected by the project have demonstrated their support for a comprehensive zoning exemption.

Recently, the Board granted requests for a comprehensive zoning exemption in New England Power Company, EFSB 12-1/D.P.U. 12-46/ D.P.U. 12-47 (2014) ("IRP"); GSRP, EFSB 08-2/D.P.U. 08-105/08-106 (2010). The Board cited the fact that the IRP and GSRP transmission projects were needed for reliability, and that each affected city and town had expressed its support for the Siting Board's issuance of zoning exemptions. The Board also stated that the exemptions would ensure uniformity in the development of large projects that span multiple municipalities. The Department has granted requests for comprehensive zoning exemptions for projects that were deemed time-sensitive, where delays could result in substantial public harm, and the municipalities involved supported the requested exemptions. While such zoning exemption approvals typically involve projects located in multiple jurisdictions, the Department has granted such exemptions for single-municipality projects as well. See NSTAR Electric Company, D.P.U. 13-64 (2014); and Princeton Municipal Light Department, D.T.E./D.P.U. 06-11 (2007).

Conversely, the Board denied a request for a comprehensive zoning exemption in NSTAR Electric Company, EFSB 10-2/D.P.U.10-131/132 (2012). The Board found that the need for the project was not so acutely time sensitive that a comprehensive exemption was needed to prevent substantial harm, nor was the Board satisfied that the municipalities had affirmatively indicated

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[21] The Company stated that in order for Footprint to be allowed to participate in the February 2013 Forward Capacity Auction for its full capacity, the Company was asked to provide certification to ISO-NE that the two new cables would be in service by 2016 (Exh. EFSB-PA-2).

their support for such exemptions (only one of the affected towns in that case expressed support for the Siting Board's issuance of a comprehensive zoning exemption). The Department has denied requests for a comprehensive zoning exemption in the following three cases: New England Power Company, D.P.U. 12-02 (2012); NSTAR Electric Company, D.P.U. 11-80 (2012); and Tennessee Gas Pipeline Company D.P.U. 11-26 (2012). The Department found the projects were not time sensitive, and were subject to only a single municipality's zoning ordinance, which eliminated the concern about ensuring the uniformity in multiple jurisdictions.

Options for Board Consideration

1. Grant the individual zoning exemptions, but not the comprehensive zoning exemption.

2. Grant the individual and comprehensive zoning exemptions.

3. Deny the individual and comprehensive zoning exemptions.